

What is claimed is:

- 1 1. A library of nucleic acid constructs, each construct comprising:  
2 a cis element sequence comprising one or more copies of a cis element to  
3 which a transcription factor is capable of binding, the cis element sequence varying  
4 within the library of constructs;  
5 a promoter sequence 3' relative to the cis element sequence; and  
6 a reporter sequence 3' relative to the promoter sequence that comprises a  
7 variable sequence that varies within the library;  
8 wherein a same cis element sequence is employed with a given reporter  
9 sequence within the library of constructs.
- 1 2. A library according to claim 1 wherein the reporter sequences comprise  
2 priming sequences 5' and 3' relative to the variable sequences.
- 1 3. A library according to claim 2 wherein the 5' and 3' priming sequences are  
2 conserved within the library.
- 1 4. A library according to claim 1 wherein the library comprises at least 10  
2 different cis elements.
- 1 5. A library according to claim 1 wherein the library comprises at least 20  
2 different cis elements.
- 1 6. A library according to claim 1 wherein the library comprises at least 50  
2 different cis elements.
- 1 7. A library according to claim 1 wherein the library comprises at least 100  
2 different cis elements.
- 1 8. A library according to claim 1 wherein the cis element sequence comprises at  
2 least two copies of the cis element.

- 1 9. A library according to claim 1 wherein the cis element sequence comprises at  
2 least three copies of the cis element.
- 1 10. A library according to claim 1 wherein the cis element sequence comprises at  
2 least four copies of the cis element.
- 1 11. A library according to claim 1 wherein an individual copy of the cis element  
2 has a length between about 5 and 100 base pairs.
- 1 12. A library according to claim 1 wherein an individual copy of the cis element  
2 has a length between about 5 and 75 base pairs.
- 1 13. A library according to claim 1 wherein an individual copy of the cis element  
2 has a length between about 5 and 50 base pairs.
- 1 14. A library according to claim 1 wherein the variable sequence of the reporter  
2 sequence is at least 15 bases in length.
- 1 15. A library according to claim 1 wherein the variable sequence of the reporter  
2 sequence is at least 25 bases in length.
- 1 16. A library according to claim 1 wherein the variable sequence of the reporter  
2 sequence is at least 50 bases in length.
- 1 17. A library according to claim 1 wherein the variable sequence of the reporter  
2 sequence is between 15 and 2000 bases in length.
- 1 18. A library according to claim 1 wherein the variable sequence of the reporter  
2 sequence is between 25 and 2000 bases in length.
- 1 19. A library according to claim 1 wherein the variable sequence of the reporter  
2 sequence is between 50 and 2000 bases in length.
- 1 20. A library according to claim 1 wherein the different reporter sequences  
2 encode different reporter proteins.

1 21. A library according to claim 20 wherein the reporter sequence is in an open  
2 reading frame relative to the promoter sequence.

1 22. A library according to claim 21 wherein the reporter sequence comprises a  
2 stop codon 3' relative to sequence encoding reporter protein.

1 23. A library of expression vectors comprising:  
2 a library of constructs, each construct comprising  
3 a cis element sequence comprising one or more copies of a cis  
4 element to which a transcription factor is capable of binding, the cis element  
5 sequence varying within the library of constructs;  
6 a promoter sequence 3' relative to the cis element sequence; and  
7 a reporter sequence 3' relative to the promoter sequence that  
8 comprises a variable sequence that varies within the library of constructs;  
9 wherein a same cis element sequence is employed with a given  
10 reporter sequence within the library of constructs.

1 24. A library according to claim 23 wherein the expression vectors are  
2 mammalian expression vectors.

1 25. A library according to claim 23 wherein the reporter sequences comprise  
2 priming sequences 5' and 3' relative to the variable sequences.

1 26. A library according to claim 23 wherein the library of constructs comprises  
2 at least 10 different cis elements.

1 27. A library according to claim 23 wherein the cis element sequence comprises  
2 at least two copies of the cis element.

1 28. A library according to claim 23 wherein the cis element sequence comprises  
2 at least three copies of the cis element.

1 29. A library according to claim 23 wherein the cis element sequence comprises  
2 at least four copies of the cis element.

10057828-012402

- 1 30. A library according to claim 23 wherein an individual copy of the cis  
2 element has a length between about 5 and 100 base pairs.
- 1 31. A library according to claim 23 wherein the variable sequence of the reporter  
2 sequence is at least 15 bases in length.
- 1 32. A library according to claim 23 wherein the variable sequence of the reporter  
2 sequence is between 15 and 2000 bases in length.
- 1 33. A library according to claim 23 wherein the different reporter sequences  
2 encode different reporter proteins.
- 1 34. A library according to claim 33 wherein the reporter sequence is in an open  
2 reading frame relative to the promoter sequence.
- 1 35. A library according to claim 34 wherein the reporter sequence comprises a  
2 stop codon 3' relative to sequence encoding reporter protein.
- 1 36. A library of cells transduced or transfected with a library of constructs, each  
2 construct comprising:  
3 a cis element sequence comprising one or more copies of a cis element to  
4 which a transcription factor is capable of binding, the cis element sequence varying  
5 within the library of constructs;  
6 a promoter sequence 3' relative to the cis element sequence; and  
7 a reporter sequence 3' relative to the promoter sequence that comprises a  
8 variable sequence that varies within the library;  
9 wherein a same cis element sequence is employed with a given reporter  
10 sequence within the library of constructs.
- 1 37. A library according to claim 36 wherein the cells are mammalian cells.
- 1 38. A library according to claim 36 wherein the reporter sequences comprise  
2 priming sequences 5' and 3' relative to the variable sequences.

10057828-012402

- 1 39. A library according to claim 36 wherein the library of constructs comprises  
2 at least 10 different cis elements.
- 1 40. A library according to claim 36 wherein the cis element sequence comprises  
2 at least two copies of the cis element.
- 1 41. A library according to claim 36 wherein the cis element sequence comprises  
2 at least three copies of the cis element.
- 1 42. A library according to claim 36 wherein the cis element sequence comprises  
2 at least four copies of the cis element.
- 1 43. A library according to claim 36 wherein an individual copy of the cis  
2 element has a length between about 5 and 100 base pairs.
- 1 44. A library according to claim 36 wherein the variable sequence of the reporter  
2 sequence is at least 15 bases in length.
- 1 45. A library according to claim 36 wherein the variable sequence of the reporter  
2 sequence is between 15 and 2000 bases in length.
- 1 46. A library according to claim 36 wherein the different reporter sequences  
2 encode different reporter proteins.
- 1 47. A library according to claim 46 wherein the reporter sequence is in an open  
2 reading frame relative to the promoter sequence.
- 1 48. A library according to claim 47 wherein the reporter sequence comprises a  
2 stop codon 3' relative to sequence encoding reporter protein.
- 1 49. A kit comprising  
2 a library of nucleic acid constructs, each construct comprising:  
3 a cis element sequence comprising one or more copies of a cis  
4 element to which a transcription factor is capable of binding, the cis element

10057828-012402  
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5 sequence varying within the library of constructs,  
6 a promoter sequence 3' relative to the cis element sequence, and  
7 a reporter sequence 3' relative to the promoter sequence that  
8 comprises a variable sequence that varies within the library,  
9 wherein a same cis element sequence is employed with a given  
10 reporter sequence within the library of constructs; and  
11 a library of hybridization probes for detecting by a hybridization assay a  
12 plurality of the variable sequences of the reporter sequences comprised in the library  
13 of nucleic acid constructs and/or complements of the variable sequences.

1 50. A kit according to claim 49, wherein the library of hybridization probes are  
2 immobilized in an array.

1 51. A kit according to claim 49 wherein the reporter sequences comprise priming  
2 sequences 5' and 3' relative to the variable sequences and the kit further comprises  
3 primers for the priming sequences.

1 52. A kit according to claim 49 wherein the library comprises at least 10  
2 different reporter sequences.

1 53. A kit according to claim 52 wherein the library of hybridization probes  
2 comprises hybridization probes for detecting at least 10 different reporter sequences.

1 54. A kit according to claim 49 wherein the library of constructs comprises at  
2 least 20 different reporter sequences.

1 55. A kit according to claim 54 wherein the library of hybridization probes  
2 comprises hybridization probes for detecting at least 20 different reporter sequences.

1 56. A kit according to claim 49 wherein the library of constructs comprises at  
2 least 50 different reporter sequences.

1 57. A kit according to claim 54 wherein the library of hybridization probes  
2 comprises hybridization probes for detecting at least 50 different reporter sequences.

1 58. A kit comprising:  
2 a library of expression vectors comprising  
3 a library of nucleic acid constructs, each construct comprising:  
4 a cis element sequence comprising one or more copies of a cis  
5 element to which a transcription factor is capable of binding, the cis element  
6 sequence varying within the library of constructs,  
7 a promoter sequence 3' relative to the cis element sequence,  
8 and  
9 a reporter sequence 3' relative to the promoter sequence that  
10 comprises a variable sequence that varies within the library,  
11 wherein a same cis element sequence is employed with a  
12 given reporter sequence within the library of constructs; and  
13 a library of hybridization probes for detecting by a hybridization assay a  
14 plurality of the variable sequences of the reporter sequences comprised in the library  
15 of nucleic acid constructs, and/or complements of the variable sequences.

1 59. A kit according to claim 58, wherein the library of expression vectors are  
2 mammalian expression vectors.

1 60. A kit according to claim 58, wherein the library of hybridization probes are  
2 immobilized in an array.

1 61. A kit according to claim 58 wherein the reporter sequences comprise priming  
2 sequences 5' and 3' relative to the variable sequences and the kit further comprises  
3 primers for the priming sequences.

1 62. A kit according to claim 58 wherein the library of expression vectors  
2 comprises at least 10 different reporter sequences.

1 63. A kit according to claim 62 wherein the library of hybridization probes  
2 comprises hybridization probes for detecting at least 10 different reporter sequences.

- 1 64. A kit according to claim 58 wherein the library of expression vectors  
2 comprises at least 20 different reporter sequences.
- 1 65. A kit according to claim 64 wherein the library of hybridization probes  
2 comprises hybridization probes for detecting at least 20 different reporter sequences.
- 1 66. A kit according to claim 58 wherein the library of expression vectors  
2 comprises at least 50 different reporter sequences.
- 1 67. A kit according to claim 64 wherein the library of hybridization probes  
2 comprises hybridization probes for detecting at least 50 different reporter sequences.
- 1 68. A kit comprising  
2 a library of cells transduced or transfected with a library of constructs, each  
3 construct comprising:  
4 a cis element sequence comprising one or more copies of a cis  
5 element to which a transcription factor is capable of binding, the cis element  
6 sequence varying within the library of constructs,  
7 a promoter sequence 3' relative to the cis element sequence, and  
8 a reporter sequence 3' relative to the promoter sequence that  
9 comprises a variable sequence that varies within the library,  
10 wherein a same cis element sequence is employed with a given  
11 reporter sequence within the library of constructs; and  
12 a library of hybridization probes for detecting by a hybridization assay a  
13 plurality of the variable sequences of the reporter sequences comprised in the library  
14 of nucleic acid constructs, and/or complements of the variable sequences.
- 1 69. A kit according to claim 68, wherein the library of cells are mammalian cells.
- 1 70. A kit according to claim 68, wherein the library of hybridization probes are  
2 immobilized in an array.



1 71. A kit according to claim 68 wherein the reporter sequences comprise priming  
2 sequences 5' and 3' relative to the variable sequences and the kit further comprises  
3 primers for the priming sequences.

1 72. A kit according to claim 68 wherein the library of cells comprises at least 10  
2 different reporter sequences.

1 73. A kit according to claim 72 wherein the library of hybridization probes  
2 comprises hybridization probes for detecting at least 10 different reporter sequences.

1 74. A kit according to claim 68 wherein the library of cells comprises at least 20  
2 different reporter sequences.

1 75. A kit according to claim 74 wherein the library of hybridization probes  
2 comprises hybridization probes for detecting at least 20 different reporter sequences.

1 76. A kit according to claim 68 wherein the library of cells comprises at least 50  
2 different reporter sequences.

1 77. A kit according to claim 74 wherein the library of hybridization probes  
2 comprises hybridization probes for detecting at least 50 different reporter sequences.

1 78. A kit comprising  
2 a library of nucleic acid constructs, each construct comprising:  
3 a cis element sequence comprising one or more copies of a cis  
4 element to which a transcription factor is capable of binding, the cis element  
5 sequence varying within the library of constructs,  
6 a promoter sequence 3' relative to the cis element sequence, and  
7 a reporter sequence 3' relative to the promoter sequence that  
8 comprises a variable sequence that varies within the library,  
9 wherein a same cis element sequence is employed with a given  
10 reporter sequence within the library of constructs; and  
11 a look-up table, in physical form and/or stored on computer readable media,

12 the look-up table identifying a relationship between the reporter sequences in the  
13 library and the cis elements in the library and/or the transcription factors that bind to  
14 the cis elements in the library.

1 79. A kit comprising:  
2 a library of expression vectors comprising  
3 a library of nucleic acid constructs, each construct comprising:  
4 a cis element sequence comprising one or more copies of a cis  
5 element to which a transcription factor is capable of binding, the cis element  
6 sequence varying within the library of constructs,  
7 a promoter sequence 3' relative to the cis element sequence,  
8 and  
9 a reporter sequence 3' relative to the promoter sequence that  
10 comprises a variable sequence that varies within the library,  
11 wherein a same cis element sequence is employed with a  
12 given reporter sequence within the library of constructs; and  
13 a look-up table, in physical form and/or stored on computer readable media,  
14 the look-up table identifying a relationship between the reporter sequences in the  
15 library of constructs and the cis elements in the library of constructs and/or the  
16 transcription factors in the library of constructs that bind to the cis elements.

1 80. A kit comprising  
2 a library of cells transduced or transfected with a library of constructs, each  
3 construct comprising:  
4 a cis element sequence comprising one or more copies of a cis  
5 element to which a transcription factor is capable of binding, the cis element  
6 sequence varying within the library of constructs,  
7 a promoter sequence 3' relative to the cis element sequence, and  
8 a reporter sequence 3' relative to the promoter sequence that  
9 comprises a variable sequence that varies within the library,  
10 wherein a same cis element sequence is employed with a given  
11 reporter sequence within the library of constructs; and

- 12 a look-up table, in physical form and/or stored on computer readable media,  
13 the look-up table identifying a relationship between the reporter sequences in the  
14 library of constructs and the cis elements in the library of constructs and/or the  
15 transcription factors in the library of constructs that bind to the cis elements.

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**LIBRARIES AND KITS FOR DETECTING  
TRANSCRIPTION FACTOR ACTIVITY**

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5

A library of nucleic acid constructs is provided in which each construct comprises a cis element sequence comprising one or more copies of a cis element to which a transcription factor is capable of binding the cis element sequence varying within the library of constructs, a promoter sequence 3' relative to the cis element sequence, a reporter sequence 3' relative to the promoter sequence that comprises a variable sequence that varies within the library and wherein a same cis element sequence is employed with a given reporter sequence within the library of constructs.

10

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